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ABSTRACT

Characteristics of 30 University of Illinois college teachers judged to be best at stimulating student curiosity and their teaching practices were studied in 1978, based on interviews and results of student evaluations of teacher performance. Attention was directed to undergraduate and graduate training, teaching experience during graduate study, teaching experience since receiving the doctorate, courses regularly taught, grading practice and kinds of exams employed, and the teacher's self-perceptions regarding their grading practices. The teachers also described their classroom activities and instructional materials. The special strengths of the teaching methods employed by the respondents were as follows: the use of vivid illustrative examples, hands-on experiences (labs, field trips, and clinical case studies), and brain teasing problems, with emphasis upon questioning and interactive lecturing. The mean number of years of teaching experience was 13 with a range from 3 to 30 years, and nearly all of the teachers taught both undergraduate and graduate courses. The commonly stated characteristics ascribed to the teachers by students to open-ended questions on course evaluation questionnaires were enthusiasm, ability to stimulate thinking, willingness to listen, humor, questioning techniques, and "best instructor." The single feature of the interviews that appeared clearly important was the teachers' encouragement of students' questions and their use of rhetorical questions in their lectures. The professors seemed to be interested in their students not just as students but as persons. Their teaching methods emphasized problematic content that stimulated curiosity, thought, and interest. Examples of teaching exercises are included. (SW)

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COLLEGE TEACHERS WHO STIMULATE CURIOSITY

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April 1979

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Since Berlyne's first paper (1954) and book (1960) dealing with epistemic curiosity there has been an increasing interest in curiosity as a source of intrinsic motivation. However, much of this interest has been reflected in experimental and/or descriptive studies with little being written that would be of direct value to teachers. Recently this writer surveyed 50 texts in educational psychology from 1920 to 1976 and found that only four contained curiosity as an index item and there was a discussion of any consequence in only two of the 50 books. In spite of this dearth of material on teaching and curiosity there seems to be a growing awareness of the importance of curiosity as one of the important conditions of learning (Day 1971).

The writer's concern for conditions that stimulate curiosity came in large part from my own graduate classes in learning. For many years I have asked elementary, secondary and college teachers what they do to stimulate the curiosity of their students. Generally the responses to that question show that teachers have never thought about it very much and their suggestions are low in quantity even though a few have had some interesting ideas. As a consequence of these personal experiences and the apparent lack of a body of literature that deals with teaching for curiosity I decided to try to identify a group of teachers who were noted for stimulating curiosity and generating intellectual excitement in their classes and then to find out what kinds of persons they were and what they did in their teaching.

There have, of course been studies of the qualities deemed important among teachers and college instructors Ryans (1960), Ronan (1971), McKeachie (1964), Cross (1976) but none aimed directly at curiosity. The closest I could find

was a study by Chambers (1972) who made an attempt to contrast "creative" and "inhibiting" instructors in chemistry and psychology. His results suggest that creative teachers: treat students as individuals, encourage students to be independent, serve as a model for students, expect excellence and maintain enthusiasm; while inhibiting teachers: discourage students' ideas, manifest insecurity, are dogmatic and rigid, do not keep up with their field, and lack enthusiasm.

The question to be studied here is: what are the characteristics of and the teaching practices of college teachers judged to be best at stimulating curiosity?

METHODS

A form letter was sent to department chairmen at the University of Illinois in the spring semester 1978:

> Dear
>
> This is to ask your help in identifying a select group of College teachers who are especially adept at arousing curiosity and stimulating inquisitive behavior among their students. Once identified I hope to interview each instructor who is willing to talk with me. If you are agreeable please write the name of one instructor whom you believe best at creating intellectual excitement in students.

Of the more than 50 nominees, I was able to arrange interviews with 30 over a period of two months in the spring semester 1978. Colleges and Schools of the 30 teachers were distributed as follows:

Liberal Arts and Sciences	9
Agriculture	9
Engineering	4
Commerce	3
Communications	2

Law	1
Social Work	1
Fine and Applied Arts	1

The interviews consisted first of a general introductory statement telling the instructors the purpose of the study and the way in which I had obtained their names. This was followed by a few standard questions as follows:

1. What undergraduate college did you attend?
2. Where did you receive you graduate training?
3. Did you have teaching experience while you were a graduate student?
4. How much teaching experience have you had since receiving the doctorate?
5. What courses do you regularly teach?
6. Do you use the CEQ*, and if so may I look at some samples?
7. Describe your grading practice and the kinds of exams you use.
8. Do you consider yourself a tough, moderate or easy grader?

These specific questions were then followed by a general question in which teachers were asked to describe their classroom activities and instructional materials. In a number of cases instructors furnished me copies of materials and exercises and written descriptions of their courses.

It was very difficult in this series of interviews to remain completely objective. After the first few meetings the theme of the important role of questions in classroom discourse emerged very clearly. Thereafter in subsequent interviews there was more than a temptation to ask questions about questioning techniques. Thus it is possible that the strength of this area was in part due to my putting words in the respondent's mouths. At other points in the interviews other common topics seemed to emerge, e.g. the instructors mentioned

*Course Evaluation Questionnaire

their availability to students, and in later interviews I found myself asking about availability. It seems unlikely that most persons who were indeed unavailable to students would perceive themselves as such or admit it if they did. (One professor did say that he did not encourage students to come in unless they had a well-thought-out question, preferably in writing.)

As with many interview studies this one generated a number of hypotheses and categories of behavior that could be studied without providing tests of hypotheses or definite answers. In defense of the hunches that were developed, as will shortly be noted, there is some cross validation from other research dealing with teaching and with the area of curiosity.

RESULTS

A. Background Factors

Tabulations of answers to the first eight interview questions gave the following information:

1. College attended. There was no pattern that could be determined. Some of the group attended small non-prestigious colleges. Three attended junior colleges.

2. Graduate College. All of the 30 interviewees attended "big time" graduate college such as Berkeley, Ohio State, Purdue, Michigan State, Harvard and Minnesota. Three obtained their gradaute degrees from the University of Illinois.

3. Graduate Teaching Experience. Eighteen of the 30 had not had graduate teaching experience. A number had been on fellowships which forbade it. Of those who had the experience most spoke of it as a positive influence. Two mentioned bad teaching that they had observed as an incentive for trying to become a good teacher.

4. Years of Teaching. The mean number of years of teaching experience was 13 with a range from 3 to 30 years.

5. Courses Taught. Nearly all of this sample taught both undergraduate and graduate courses. Many taught the introductory course in their department.

6. Course Evaluation Questionnaires. These data were available for about a third of this group of teachers. Ratings on the CEQ (a standard form prepared by the Office of Instructional Resources) were as might be expected quite high. The range was from the highest possible scores to somewhat below the University average. The most commonly stated views by students in the open-ended questions (in the order of frequency) were as follows:

a. Enthusiasm

b. Stimulated thinking

c. Willingness to listen

d. Humor

e. Questioning techniques good

f. Best instructor I have had in the University

Item 13 on the CEQ is "The instructor demonstrates a thorough knowledge of subject matter." All ten of those for whom I had CEQ's had a high rating on this item.

7. Examinations and Grading. Nearly half of this group of 30 had sought help from the Office of Instructional Resources in the preparation of examinations. It was my impression that these instructors were sophisticated about the preparation and analysis of examinations. Two of the 30 reported that they were under departmental "pressure" in the assigning of grades, and one of the 30 graded by departmental curve. None of the group used a mastery approach to grading but two were thinking of trying it. About two-thirds of the group

reported using criterion grading rather than some system of ranking.

8. Toughness. The question do you consider yourself a tough, moderate or easy grader was answered as follows:

Tough	16
Moderate	15
Easy	9

Several expressed the view that it was possible to have rigorous expectations for students and with proper teaching the students "come through." One teacher said that he "agonized over every low grade." The dominant view seemed to be that if the criteria for success are made clear at the beginning of a course most students will achieve sufficiently well to allow for a good grade. In two instances these teachers reflected the commonly accepted view that "good teachers grade tough." In one case an instructor asserted that she knew there was a positive correlation between CEQ ratings and toughness of grading. If indeed there is such a positive correlation the instructors in this sample are examples to the contrary. Once again it should be noted that there is a difference between rigor and high expectations, and grading practices.

B. Teaching Characteristics--General Impressions

As noted, the CEQ's of this study, and the results of Chamber's (1972) study both characterized teachers as enthusiastic, good at arousing interest, liking students and encouraging independence. In the open-ended interviews the self-descriptions of the instructors provided information which can be summarized into the following categories. These categories are placed in order of what appeared most frequently and what appeared most important.

1. Questioning Techniques. No other single feature in these interviews was as clear cut in importance and frequency of mention. These teachers almost to a person reported that they asked questions, encouraged students' questions, and asked rhetorical questions in their lectures. Over and over without leading remarks on my part they said that they accepted all questions, never treated any question as a "dumb" question, and some went so far as to say that they rewarded questions. One instructor in engineering said that the best question each week earned a pitcher of beer.

2. Stimulation. In a variety of ways these teachers reported efforts to stimulate students. Means of doing so included field trips, simulation, posing of problems, playing devil's advocate, use of practical examples and providing "hands-on" experience in labs or field settings. Stimulation through simulation might be an apt phrase to describe much of this effort. There seemed to be a flavor of using various means of trying to make students independent through participation in research projects, attending national meetings and writing research papers. One professor who had received the best teacher award in two different departments said that he forced students to give papers at national and international meetings.

3. Process vs. Substance. Both from students' comments on the CEQ's and from self reports a prominent feature in the operation of this group of instructors was the concentration upon students' methods of thinking and problem solving. Typical students' comments: "This was a good think course," "This instructor stimulated our thought patterns;" "taught us to think for ourselves." An instructor's comment: "I give constant emphasis to process. The end product is not the important thing; process and problem solving is." Fully half volunteered the view that their emphasis was upon process. One

professor said: "Success is not a destination but a journey."

4. Relationship with Students. These professors seemed to be interested in their students not just as students but as persons. Somewhat related to point 3 above was their professed aim of developing these students in a variety of ways not just as chemists, mathematicians or philosophers but as persons. These values were reflected in such behaviors as: maintaining an "open-door" policy, taking students out to coffee, inviting research students to dinner on a weekly basis, knowing students' names, and taking pictures of all students every semester. One professor said that he told his students "if you see me out of class and I don't speak, trip me."

C. Teaching Methods

In section B above I attempted to give a summary of what emerged from the interviews. The picture was one of teachers who actively and enthusiastically interacted with students with the aim of developing independence, the capacity to think and to solve problems. The methods by which these teachers pursued this aim was to this writer most facinating. Here are some of the things they did.

1. Perplexing "Brainteasing" Problems. From short incisive questions to week-long exercises I found in these instructors' methods a common useage of problematic content that seemed to me excellent at stimulating curiosity, thought and interest. Here are some examples:

In a design course

The Bomb

Inscribed with chalk, on two 4' x 8' tables, are twenty irregular and disproportionate shapes, each representing a municipality. Each student upon entering the classroom is given control over one of these areas and the

contents of his pockets in turn, become the capital goods of his municipality. This wealth may be in the form of a pocketknife, a paper clip, a rubber band, or a fingernail file. Upon a blackboard is a sketch of a partially complete system for constructing a "bomb," consisting of a paper missile fired from a tub-like rocket with the aid of a rubber band and a triggering pin. Above the table tops is suspended a flat disc which represents the moon. The following instructions are given: if a missile, when fired, falls upon someone's property, the one who did the firing will own that property plus all the capital goods thereon. If a missile lands on the "moon" it gives the student the advantage of mobility; he can now move anywhere around the classroom to fire his missiles. End of ground rules. No one has stated that it is necessary to fire the missiles.

Almost immediately the two tables cooperate but independent of each other. Their goal is to "get the other table." Alliances spring up between adjoining neighbors; some try mass producing and sharing the scarce supply of rubber bands and elastic. (The top of a pair of jockey shorts are sacrificed for the apparent war effort.) Those with knives cut paper easily and efficiently; those without use their fingernails and improvised straightedges, and are accused of making "dirty bombs" because of the resultant ragged edges. The "bombs" began to rain down and neighbors began to mistrust one another and protect their flanks by lobbing missiles on adjoining municipalities with a curt, "Sorry." No one tries for the moon because time is running out. When it is over, a discussion and analysis follow and the arguments drift to world politics. In the end, some simple truths are revealed.

There were no winners.

Moses

As a group, the class is asked to recall the ten commandments and put them on the blackboard. Then, still acting as a group, they were asked to list them in the order of their importance. A majority vote would determine the listing.

The most important commandment and by a unanimous vote was "Thou shalt not kill." The least important or number ten was also unaminous, "Thou shall keep holy the Sabbath day." Tied for eighth and ninth place was "Thou shall not commit adultery" and "Honor thou father and mother." The most disturbing listing was number two, that of "Thou shall not steal." When it was pointed out to them that a faculty member had to lock his car, his home, his office, his shop, or lose whatever the students could walk off with, the answer was that faculty members are part of the establishment and thereby fair game. Furthermore, this wasn't stealing. Stealing meant taking things from each other.

Honor among thieves.

Astronaut

Given a raw egg to represent an astronaut, the problem was to protect the egg from shock, water, and fire, typical blast-off and re-entry problems. The students designed and built a capsule which was then launched from a

student designed launching pad consisting of two bolted truck springs, cocked and held down until the proper count-down release moment. The capsule had to pass a preliminary fire test consisting of a welding torch held for ten seconds at a distance of eight inches from the capsule. After a 200-foot catapult into the University's reflecting pool, the capsule was opened and examined for cracks and moisture.

Using such cushioning devices as a wooden sphere filled with grease and a cocktail shaker lined with foam rubber and carpet padding, many landed their eggs in the water unbroken. But the champion of the day was a student who surpassed the requirements--with showmanship. His missile blew itself apart in mid-air with a timed firecracker, releasing a handful of tiny silk, American flags and a parachute that gently lowered into the pool a capsule containing the egg packed in gelatin and peat moss. When the capsule touched the water the moisture melted an aspirin tablet switching on a tiny motor with propelled the uncracked egg proudly to shore.

Variation #1. Ship a Christmas ornament to another design school at minimal expense to arrive during the Christmas rush.

Variation #2. In progress. Polish students from the University of Kracow will decorate a blown egg and package it at minimal expense to arrive in time for Easter here at the University of Illinois.

In a course in Communication

Will electronics dominate as a communication system and make print and oral forms residual?

Is mental telepathy the next communication system after electronics?

Is Martin Buber correct when he argues that restoring dialogic communication (revitalizing and I-thou relationships) is our most desirable objective today?

In a Philosophy Course

If a way were found to grow a fetus outside the uterus what would be the effect upon our attitudes toward abortion?

In a History Course

In what ways were the Boston massacre and Kent State similar?

In a course in Agricultural Engineering

If two men were paid to do the work of a one-quarter horse power electric motor what would be their approximate hourly salary?

In an Agronomy Course

September 27, 1977

Section for Receiving Suggestions
Department of Agronomy
University of Illinois

Dear Sirs:

I have just been provided the opportunity of obtaining a dealership for a new product called Genesis II (see enclosed brochure). Since fertilizer costs are continuing to increase and we grow primarily corn, soybeans and wheat in our area, this appears to be an attractive opportunity. To obtain the dealership I must invest several thousand dollars. Do you have any information on this product and would you expect this to be a wise investment for me? I am proposing to sell this product at $50.00 per gallon.

Sincerely,

Can I Makeabuck
RR #1
Centralia, IL

Students in this class are given a copy of the above letter and a two page brochure describing the product Genesis II, a fictional nitrogen fixing blue algae, and are asked to compose an answer to Can I Makeabuck.

2. Out-of-Class Activities. It is clear that for this group of instructors teaching is not perceived as an activity bounded by classroom walls. As already noted in summary these professors enjoyed a relationship with students that found themselves engaged in a variety of out-of-class situations. A simple listing should suffice to make the point:

a. Taking graduate students to coffee.

b. Taking students to national professional meetings.

c. Having an "open-door" policy in my office. Students welcome at any time.

d. Any student who comes up with a better solution than mine gets a trip to Kam's at my expense.

e. Winning student (highest grade) gets taken to a local pizza parlor.

f. Research students invited to my home for dinner once a week.

g. Busload of students taken to Washington to visit the Secretary of Agriculture and to New York for a visit with executives of the Chase Manhattan Bank.

h. Students encouraged to hunt up resource persons outside the University and bring them to the lab for project work.

3. Vivid Illustrative Experiences. Curiosity seems to thrive when novel and conflict arousing stimuli are presented. In the following examples one may see how this group of instructors stimulated interest and curiosity.

a. Students' are assembled for the lecture in the auditorium for this large class. Onto the stage limps a ragged figure dressed in the costume of a Greek soldier. He is a survivor of the Trojan War. Professor A interviews him about his experiences. This is but one of dozens of examples of the way in which this instructor uses student performers, classical music, kodachrome slides and artifacts of the culture to bring the past vividly into perspective for his students.

b. In his travels to Latin-America professor B has made six movies and developed an extensive slide collection; thus he is able visually to transport his students onto an anthropological field trip.

c. The library stacks at the University of Illinois are arranged in such way that each of the six floors contain a separate

area of reference material, Professor C has had his students analyze the graffiti in the rest rooms of each floor to see if there is a correspondence between the type of graffiti and the area of specialization represented by that floor of the stacks.

d. Professor D presents a series of pictures via an overhead projector to show the bodily injuries resulting from different kinds of child abuse.

e. Slides showing the pathology resulting from a shortage of vitamin B_2 are presented by Professor E who also presents visual examples of hospital malnutrition.

f. Professor F removes all the chairs and stools beforehand from the classroom and when the class convenes, divides the students into disparate, authropometric teams; the fat with the skinny, girls with boys, the short with the tall, etc. Equipped with chalk, paper and string (no rulers or measuring devices), they are to turn in the dimensions of an ideal dining room chair. This should take an hour and the remaining time should be spent nailing together some plywood forms that would reflect those dimensions. The dimensions of a dining table, seating six, should also be asked for.

4. Interactive Lecturing. As previously stated much of the significant teaching exhibited by this group of instructors occurred outside the classroom and in field and laboratory settings. Nevertheless the dominant mode of instruction was the lecture-discussion method. Universally it seemed to me this group of "stars" had developed various methods of interacting with students

in lecture sessions, and of aiming for overt responsive behavior by their students. The means that they used to promote this interactive effect varied by field and by their individual personalities. In the following points I have tried to convey both the means and some specific examples.

a. There was an attempt to concretize material through the use of anecdotes and everyday examples.

b. Several in the group reported the use of brainstorming as a means of encouraging students' participation. Usually this involved dividing the class into subgroups of eight to ten students each.

c. Playing devil's advocate was reported as a technique by a number of the respondents. For example in a philosophy class the instructor reported saying: "I think students are the trash of the earth so why shouldn't I give as many low grades as I possible can?"

d. As previously asserted the liberal use of questions was seen as a means of evoking students' activity as well as their attention. One instructor said, "I wouldn't mind having a class where the classwork <u>was</u> student's questions."

e. At seat exercises were sometimes inserted into the lecture material.

f. A number of the respondents volunteered that they walked around the class while lecturing. They saw being "nailed" to the podium as a very bad practice.

g. Knowing students and their backgrounds allowed some of these instructors to direct questions and elicit comments from

individuals whose prior experience was particularly relevant to a point under discussion.

h. One instructor whose feedback on the CEQ showed him to be attempting to cover too much material cut out two-thirds of that material in the next semester. This same instructor encouraged student activity by inviting them to make up a quiz for him to take. They did, and he did and he missed a number of items.

i. A most elaborate plan for building student interaction was developed by one professor who combined the semi-notes techniques of Zumwalt (1954) with class discussion. Students are presented major topics, questions, problems in written form with spaces left for inserting the details which emerge as students' respond to the information presented by the lecturer and their classmates. As used by this professor about two-thirds of what would normally constitute a complete set of notes is prewritten on handouts. The remaining one-third is filled in by the students.

5. Hands-on-Experiences. One professor commented: "everybody is curious; just don't stifle that curiosity. Provide activities that allow students to answer their own questions. There is no substitute for actual experience." Following are a few examples of the ways in which this group of instructors gave these experiences.

a. Professor A asked each student to design a toy and then make fifty of them. The purpose here was to involve the student with the formidable task of multiplying his design by thinking

in terms of mass production. Since cost was involved he had to plan for a maximum usage of his material as well as a method for procedure. In addition, packaging was stressed which could be an integral part of the toy or a separate design. The raw material used such as wood, plastic, fabric and cardboard was donated by local businessmen and the final products were distributed by Santa Claus through a local charity agency. This problem is an excellent community project and cooperation comes easy.

b. Every student in Professor B's class is given the experience of inseminating a cow.

c. Students in Professor C's class were given the opportunity of interviewing the Secretary of Agriculture.

d. Students in Professor D's class design and actually construct a piece of farm machinery and then take it into the field and test it operationally.

e. Professor E takes his students to farms when he goes in a service-consultive role for the College of Agriculture. They too are consultants.

It is of course obvious that in lab courses students engage in actual experimenal work, and there are numerous examples that could be cited. More interesting here is the fact that in a number of instances this group of teachers sought ways of providing hands on experience in courses which could and often are taught strictly as "talk" courses. Thus a course which included the topic of behavior modification was taught in such a way that each student was given an opportunity to try out behavior modification in a practical setting.

DISCUSSION

By reputation throughout the campus, by their scores on the Course Evaluation Questionnaires, by the fact that several of these instructors had won best teacher awards, and by nomination of their chairmen this group of instructors has clearly shown themselves to be an outstanding group. I might add that after thirty years of teaching at the University of Illinois I also had some basis of comparison, and interviewing these teachers was an exhilarating experience, and convinced me that Departmental Chairmen do indeed know who their excellent instructors are. For purposes of this research the added question is whether or not these obviously superior instructors are also the ones best at stimulating curiosity and creating intellectual excitement in their students. At this point there is no way of providing a definite answer to that question. I can say that in several instances when I introduced the topic in the interviews the respondents immediately gave evidence that they knew why they had been chosen, and began quickly to refer to exercises and activities that they believed important "stimulators." It would have been most desirable to have had access to the thousand of CEQ's on file in the Office of Instructional Resources so that the group might have been chosen on the basis of students' reactions to those items that deal with the stimulation of curiosity. Unfortunately at the time of this study University policy prevented my having these data. Perhaps future investigations will be able to use them.

This study could have been strengthened by combining interviews with the observation of classes of each of the instructors. Time limitations and the judgment that in some cases this would have been intrusive prevented observations.

English (1958) defined curiosity as "the tendency to investigate, to seek, to observe the novel, to obtain information." In that definition tendency is singular which might lead to the assumption that curiosity is indeed one trait. But there is good reason, Langevin (1971), to believe that it is not unitary and that there are various kinds of curiosity. Kreitler (1975) has suggested that there is perceptual curiosity, manipulative curiosity and conceptual curiosity. It seems reasonable that instructors who were best at developing or taking advantage of these tendencies would find instructional methods and materials that would jibe with these different kinds of curiosity. How do these 30 instructors "stack up?" Recalling the special strengths of their teaching methods we can observe the following:

Perceptual curiosity	The use of vivid illustrative examples
Manipulative curiosity	Hands-on experiences, Labs, field trips, Clinical case studies
Conceptual curiosity	Brain teasing problems, emphasis upon questioning, and interactive lecturing

In short the categories of instructional activity that seemed to stand out for these professors made a good fit with what seem to be the major kinds of curiosity.

If any one thing emerged from this study it was the importance ascribed to questions and questioning by these teachers. Since Berlyne's (1954) early work the relationship between prequestions and curiosity has been known, and the salutary effect of questions as facilitators of learning has been demonstrated over and over. Gall (1970), Watts (1971), Rothkopf (1970). Even rhetorical questions have been shown to have a positive effect upon learning,

Zillman (1973). Given the relationship between questions and curiosity it is astonishing to note that not one of eight different schemes for categorizing classroom questions includes arousal of curiosity as a category. Gall (1970).

On the basis of this study and related research I am tempted to assert that the most direct access to improving college instruction might be found in activities designed to improve instructors' questioning techniques. It is especially encouraging to note that even a few hours of instruction of public school teachers resulted in the increase of thought questions from 37% to 52% and the increase in probing questions from 8.3% to 13.9%. Borg (1970).

This opportunity to talk with great teachers in a great university was a gratifying experience. Even though I myself have taught a course called Psychology of College Teaching and have over the years done in-service work with faculties in Engineering, Agriculture and Commerce I was still impressed by the ingenuity and creative and stimulating teaching of these instructors. Unfortunately from a pedagogical standpoint professors do their scholarly work and writing in their own disciplines, and not as teachers. Thus only a couple of this group had written anything about their teaching methods and material. While some colleagues in their own departments and some teaching assistants may indirectly benefit from the teaching innovations of these superior teachers, the greater potential benefits to the rest of us in the university are lost for lack of appropriate communication.

We can reward good teaching, and we should but it is unlikely that the general level of instructional effectiveness can be raised unless more of us find out how to be effective. These teachers who seem to stimulate

curiosity and create intellectual excitement have something to tell us and we ought to seek institutional activities that allow them to do so.

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